



Public Service Electric and Gas Company P.O. Box 236 Hancocks Bridge, New Jersey 08038
Hope Creek Generating Station

December 13, 1990

U. S. Nuclear Regulatory Commission
Document Control Desk
Washington, DC 20555

Dear Sir:

HOPE CREEK GENERATING STATION
DOCKET NO. 50-354
UNIT NO. 1
LICENSEE EVENT REPORT 90-028-00

This Licensee Event Report is being submitted pursuant to the requirements of 10CFR50.73(a)(2)(iv).

Sincerely,

J.J. Hagan
General Manager -
Hope Creek Operations

RBC/

Attachment
SORC Mtg. 90-115

C Distribution

The Energy People

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LICENSEE EVENT REPORT

FACILITY NAME (1) HOPE CREEK GENERATING STATION												DOCKET NUMBER (2) 0 5 0 0 0 3 5 4				PAGE (3) 1 OF 5	
TITLE (4): TURBINE TRIP ON MOISTURE SEPARATOR HIGH LEVEL RESULTS IN REACTOR SCRAM DUE TO MOISTURE SEPARATOR LEVEL CONTROL SYSTEM MALFUNCTION																	
EVENT DATE (5)			LER NUMBER (6)				REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)							
MONTH	DAY	YEAR	YEAR	**	NUMBER	**	REV	MONTH	DAY	YEAR	FACILITY NAME(S)		DOCKET NUMBER(S)				
1	1	1790	90	-	028	-	00	1	2	1290							
OPERATING MODE (9)		1 THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10CFR: (CHECK ONE OR MORE BELOW) (11)															
		20.402(b)		20.405(c)		XX 50.73(a)(2)(iv)		73.71(b)									
POWER LEVEL		20.405(a)(1)(i)		50.36(c)(1)		50.73(a)(2)(v)		73.71(c)									
1 0 0		20.405(a)(1)(ii)		50.36(c)(2)		50.73(a)(2)(vii)		OTHER (Specify in									
		20.405(a)(1)(iii)		50.73(a)(2)(i)		50.73(a)(2)(viii)(A)		Abstract below									
////////////////////		20.405(a)(1)(iv)		50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)		and in Text)									
////////////////////		20.405(a)(1)(v)		50.73(a)(2)(iii)		50.73(a)(2)(x)											
LICENSEE CONTACT FOR THIS LER (12)																	
NAME Richard Cowles, Senior Staff Engineer - Technical										TELEPHONE NUMBER 6 0 9 3 3 9 3 4 3 1							
COMPLETE ONE LINE FOR EACH COMPONENT FAILURE NOTED IN THIS REPORT (13)																	
CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS?	////////	CAUSE	SYSTEM	COMPONENT	MANUFAC-TURER	REPORTABLE TO NPRDS?	////////	////////	////////	////////			
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SUPPLEMENTAL REPORT EXPECTED? (14) YES [XX] NO										DATE EXPECTED (15)							
										MONTH	DAY	YEAR	////////	////////			
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ABSTRACT (16)

On 11/17/90 at 0352, during performance of a surveillance procedure which tests the Main Turbine Combined Intermediate Valves (CIV), the "A" Moisture Separator experienced a high level condition. In response to this high level condition, the associated dump valve began to open, but level continued to rise, and the main turbine tripped on moisture separator high level. Immediately following the turbine trip, the reactor scrambled on a Turbine control Valve Closure signal from the Reactor Protection System. All controls rods were verified to be inserted, and plant systems responded as expected. Investigation subsequent to the scram determined that the initiating cause of this event to be a malfunction of the level control system for the "A" Moisture Separator. Several factors appear to have contributed to this malfunction: sluggish operation of the emergency dump valve, misoperation of moisture separator level switches, potentially leaking check valves on the normal drain line, and a possible obstruction in either the normal drain or emergency dump paths. Interim corrective actions consisted of troubleshooting of the level control system, reviewing moisture separator level response during past CIV cycling, and comparing the level control response of "A" Moisture Separator against that of "B" Moisture Separator. Additionally, CIV cycling will be conducted at lower power levels until the root cause of the level control problems have been determined and corrected. A supplemental report will be submitted following internal inspection of the "A" Moisture Separator and associated components during the stations third refueling outage (scheduled to commence on 12/26/90).

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PLANT AND SYSTEM IDENTIFICATION

General Electric - Boiling Water Reactor (BWR/4)
 Main Turbine (EIIS Designation: TA)
 Moisture Separator (EIIS Designation: SN)
 Reactor Protection System (EIIS Designation: JC)
 Main Steam System (EIIS Designation:)
 Feedwater System (EIIS Designation: SJ)
 Turbine Instrumentation (EIIS Designation:)

IDENTIFICATION OF OCCURRENCE

Turbine Trip on Moisture Separator High Level Results in Reactor Scram Due to Moisture Separator Level Control System Malfunction

Event Date: 11/17/90

Event Time: 0352

This LER was initiated by Incident Report No. 90-155

CONDITIONS PRIOR TO OCCURRENCE

Plant in OPERATIONAL CONDITION 1 (Power Operation), Reactor Power 100%, Unit Load 1100MWe.

DESCRIPTION OF OCCURRENCE

On 11/17/90 at 0352, during performance of a surveillance procedure which tests the Main Turbine Combined Intermediate Valves (CIV), the "A" Moisture Separator experience a high level condition. In response to this high level condition, the associated dump valve began to open, but level continued to rise, and the main turbine tripped on moisture separator high level. Immediately following the turbine trip, the reactor scrambled on a turbine control valve closure signal from the Reactor Protection system. All plant systems responded as expected.

The "H" and "P" Safety Relief Valves (SRVs) lifted as designed to control reactor pressure, and vessel level decreased to approximately 8" (narrow range indication) during the course of the transient, well above any Emergency Core Cooling System actuation levels. Vessel level was restored using the Reactor Feedwater System. Additionally, the Redundant Reactivity Control System (RRCS) actuated on high reactor vessel pressure prior to the SRVs lifting. Control room personnel reset the scram signal, and plant parameters were stabilized in Operational Condition 3 within 30 minutes.

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APPARENT CAUSE OF OCCURRENCE

The initiating cause of this event was a malfunction of the "A" Moisture Separator level control system. Several factors appear to have contributed to this malfunction: sluggish operation of the emergency dump valve, misoperation of moisture separator level switches, potentially leaking check valves on the normal drain line, and a possible obstruction in either the normal drain or emergency dump paths.

ANALYSIS OF OCCURRENCE

Refer to Attachment 1. Moisture separator level is normally controlled via the cycling of level control valves LV-1364A, B, and C, which route condensate from the Moisture Separator Drain Tank to Feedwater Heaters 5A, B, and C via individual 8" lines. In the event of a high drain tank level, the Emergency Dump Valve opens and drains directly to the Main Condenser via a single 8" line. The cycling of a CIV induces a significant transient on the associated moisture separator, and a swing in level during the course of cycling a CIV is normal and expected, however, not as severe as was experienced in this event.

A Significant Event Response Team (SERT) was assembled following the scram, and was tasked with reviewing the scram, determining causal factors, and reviewing plant response to the transient. The SERT conducted a review of past work orders associated with the "A" Moisture Separator, performed a system walkdown, reviewed test results of data obtained on the level control system following the scram, reviewed "as-found" level control system instrumentation data, and evaluated the ability of the moisture separator level control system to perform as designed. Additionally, internal and external operating experience of similar events was reviewed.

The SERT drew two conclusions from the information gathered during the investigation:

1. The normal drain system is capable of draining the moisture separator even under the worst case scenario which considered the unrealistic case of maximum water entrainment in the steam. The system operates properly with the drain valves nearly closed. If the valves operated sluggishly, as appears to have been the case during this scram, they may not respond rapidly enough to terminate a quick level increase as was experienced during the CIV testing. However, under normal conditions, the dump valve is available to terminate the level increase when this condition occurs.

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ANALYSIS OF OCCURRENCE, CONT'D

- The dump valve was slow in responding to the rate of rise experience during this transient. The valve did not begin to stroke open until 22 seconds after the Moisture Separator Normal Level High alarm was received in the control room. At that point, the level in the Moisture Separator "A" Emergency Dump Tank had already exceeded its high level alarm point. However, post-scrum testing indicates that even though the valve was slow in responding, immediately after beginning to open, a decrease in moisture separator level should have occurred.

The SERT noted that differences may exist between the "A" and "B" Moisture Separator dump valves, and that these differences would account for variation in performance between the "A" and "B" Moisture Separators.

Additional system inspections and testing will be conducted during the stations third refueling outage (scheduled to commence 12/26/90) in a continuing effort to determine the primary reason for the moisture separator level excursion. Interim corrective actions have been established to prevent a recurrence prior to the outage.

PREVIOUS OCCURRENCES

A similar scram occurred on 1/6/90 (Ref: LER 90-001). The cause of that scram was attributed equipment deficiencies (level control system instrumentation tuning) and personnel error in cycling CIVs out of sequence. Corrective actions were focused on these causes. The SERT investigation determined that these causes did not contribute to the scram noted in this report.

SAFETY SIGNIFICANCE

The potential safety impact of this event was minimal, as a plant scram is an analyzed transient, and all systems responded as expected. This event posed no threat to the health and safety of the general public.

CORRECTIVE ACTIONS

- Until internal inspections of the "A" Moisture Separator and associated components can be conducted (3rd refuel outage), CIV cycling will be conducted at lower power levels.

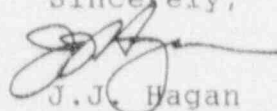
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CORRECTIVE ACTIONS, CONT'D

2. The emergency dump valve was disassembled, inspected, and the valve operator stroke time was adjusted following reassembly.
3. The "A" Moisture Separator level switches were exercised, calibrated, and returned to service.
4. In a continuing effort to determine the primary reason for the moisture separator level excursion, extensive inspection of the Moisture Separator and its associated components will be conducted during the upcoming refueling outage.
5. Control room personnel will be instructed to immediately terminate CIV cycling during weekly testing at any point that Moisture Separator level begins increasing.
6. A supplement to this report will be submitted by 5/30/91, detailing findings of the outage inspection.

Sincerely,



J.J. Hagan
General Manager -
Hope Creek Operations

RBC/

SORC Mtg. 90-115

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ATTACHMENT 1

MOISTURE SEPARATOR LEVEL CONTROL SYSTEM

